

MARSHALL STAR

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CFC 2012: Many Opportunities Still Available for Community Service Days, Bus Tours

By Megan Davidson

The Marshall Space Flight Center's Combined Federal Campaign Community Service Days and bus tours are filling up fast, but several opportunities are still available to those who want to lace up their sneakers and volunteer, or grab a seat on the bus.

Seventy people are needed to help at the Special Olympics from 8 a.m. to 1 p.m. Oct. 23 at Milton Frank Stadium in Huntsville.

Volunteers will be paired with one athlete to escort throughout the day to events, and assist in other areas as needed.



Other CFC Community Service Days also need a few good volunteers, including:

- The 2012 International Heritage Festival: Burritt on the Mountain's International Heritage Festival is an opportunity for participants to learn about other cultures through music, dance, food, crafts and history. It will be open for school field trips Oct. 18-19. Volunteer duties include escorting and assisting cultural presenters; lunch preparation and serving; runner/presenter check-in; school field trip lunch unloading and monitoring; and dance monitoring in the church. Seven

volunteers are still needed for Oct. 19.

- Christmas Charities: Three volunteers are needed to take telephone applications Oct. 29. Three slots are available Dec. 20 and four slots Dec. 22 for taking applications and filling bags.
- Habitat for Humanity: Several volunteer openings are still available throughout October and November to those who would like to help build a home for someone in need. Activities include new construction, renovations and landscaping.
- Harris Home for Children: Twenty volunteers are needed Oct. 29 to help paint the organization's administration building and prepare children's rooms at the facility for an upcoming project.
- The Autism Resource Foundation: Several volunteers are still needed through December for general office duties, including making and answering phone calls, updating the organization's resource book, filing, making copies and laminating.

Marshall team members can get more information and sign up for Community Service Days [here](#).

Seats also are still available for bus tours, including stops at:

- Ability Plus: 9-11 a.m. Oct. 18 and 1-3 p.m. Nov. 14
- National Children's Advocacy Center: 9-11 a.m. Oct. 23
- Land Trust of North Alabama: 1-3 p.m. Oct. 25 and 9-11 a.m. Nov. 15
- Care Assurance System for the Aging and Homebound (CASA): 9-11 a.m. Nov. 1
- Therapy Partners: 1-3 p.m. Nov. 8

Marshall team members can sign up for a bus tour [here](#). To make a CFC donation to one of these or other charitable organizations, employees can visit the [CFC ExplorNet page](#). The contribution deadline is Dec. 15. The Marshall Center's CFC fundraising goal is set at \$700,000.

Marshall's CFC effort is part of the Tennessee Valley Combined Federal Campaign -- a joint effort that also includes the Army's Aviation and Missile Command and other federal agencies at Redstone Arsenal and in surrounding Alabama and Tennessee counties.

Davidson, an Analytical Services Inc. employee, supports the Office of Strategic Analysis & Communications.

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First Contracted SpaceX Resupply Mission Launches with NASA Cargo to Space Station

NASA news release



A Space Exploration Technologies Corp., known as SpaceX, Falcon 9 rocket carrying its Dragon spacecraft, lifted off from Cape Canaveral Air Force Station in Florida at 7:35 p.m. CDT Oct. 7. This launch began NASA's first contracted cargo delivery flight, designated SpaceX CRS-1, to the International Space Station. Under NASA's Commercial Resupply Services contract, SpaceX will fly at least 12 cargo missions to the space station through 2016. The contract is worth \$1.6 billion.

Image left: The SpaceX Falcon 9 and Dragon capsule lift off Oct. 7. (NASA)

The Dragon spacecraft was grappled Oct. 10 by Expedition 33 crew members Sunita Williams of NASA and Aki Hoshide of the Japan Aerospace Exploration Agency, who will use the station's robotic arm to install the Dragon. The capsule is scheduled to spend 18 days attached to the station. It then will return for a splashdown in the Pacific Ocean off the coast of southern California.

"Just over one year after the retirement of the space shuttle, we have returned space station cargo resupply missions to U.S. soil and are bringing the jobs associated with this work back to America," NASA Administrator Charles Bolden said. "The SpaceX launch marks the official start of commercial resupply missions by American companies operating out of U.S. spaceports like the one right here in Florida."

Dragon is delivering a total of 882 pounds of supplies to the orbiting laboratory, including 260 pounds of crew supplies, 390 pounds of scientific research, 225 pounds of hardware and several pounds of other supplies. Dragon will return a total of 1,673 pounds of supplies, including 163 pounds of crew supplies, 866 pounds of scientific research, 518 pounds of vehicle hardware and other hardware.

Dragon's capability to return cargo from the station is critical for supporting scientific research in the orbiting laboratory's unique microgravity environment, which enables important benefits for humanity and vastly increases understanding of how humans can safely work, live and thrive in space for long periods. The ability to return frozen samples is a first for this flight and will be tremendously beneficial to the station's research community. Not since the space shuttle have NASA and its international partners been able to return considerable amounts of research and samples for analysis.

Materials being launched on Dragon will support experiments in plant cell biology, human biotechnology and various materials technology demonstrations, among others. One experiment, called Micro 6, will examine the effects of microgravity on the opportunistic yeast *Candida albicans*, which is present on all humans. Another experiment, called Resist Tubule, will evaluate how microgravity affects the growth of cell walls in a plant called *Arabidopsis*. About 50 percent of the energy expended by terrestrial-bound plants is dedicated to structural support to overcome gravity. Understanding how the genes that control this energy expenditure operate in microgravity could have implications for future genetically modified plants and food supply. Both Micro 6 and Resist Tubule will return with the Dragon at the end of its mission.

SpaceX is one of two companies that built and tested new cargo spacecraft under NASA's Commercial Orbital Transportation Services, or COTS, program. SpaceX completed its final demonstration test in May when it flew to the station and performed a series of checkout maneuvers, ultimately being grappled by the station crew and installed on the complex.

Orbital Sciences is the other company participating in COTS. Orbital's Antares launch vehicle is currently on the launch pad at Wallops Flight Facility in Virginia. The launch vehicle and pad will undergo a series of fueling tests that will take about

three weeks. After tests are completed, a hot fire test will be conducted. Finally, a test flight of the Antares rocket with a simulated Cygnus spacecraft will be flown in late 2012. A demonstration flight of Cygnus to the station is planned in early 2013.

NASA initiatives like COTS and the agency's Commercial Crew Program are helping develop a robust U.S. commercial space transportation industry with the goal of achieving safe, reliable and cost-effective transportation to and from the space station and low Earth orbit. In addition to cargo flights, NASA's commercial space partners are making progress toward a launch of astronauts from U.S. soil in the next five years.

While NASA works with U.S. industry partners to develop and advance these commercial spaceflight capabilities, the agency also is developing the Orion spacecraft and the Space Launch System, a crew capsule and heavy-lift rocket to provide an entirely new capability for human exploration. Designed to be flexible for launching spacecraft for crew and cargo missions, SLS and Orion will expand human presence beyond low Earth orbit and enable new missions of exploration in the solar system.

To follow the SpaceX CRS-1 mission and for more information about the International Space Station and its crew, visit <http://www.nasa.gov/station>.

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Marshall Committee Aims to Raise Awareness about Breast Cancer Oct. 11

To mark Breast Cancer Awareness Month, a group of Marshall Space Flight Center women - all survivors of the disease -- will be available for questions and support from 10 a.m. to 1 p.m. Oct. 11 in Building 4203. They also will hand out American Cancer Society pamphlets and goodies. Marshall team members are encouraged to wear pink that day in honor of Breast Cancer Awareness Month.

"This is a great way for us to bring awareness to the Marshall community about breast cancer -- from screening guidelines and symptoms, to treatment side effects," said group member Cindy Stemple, a Marshall Center engineer and two-time cancer survivor. "It's also very helpful and meaningful for people who have loved ones, or are themselves going through cancer to have a support group to call upon here -- women who know first-hand what they are going through."



A story on Stemple's cancer battle will be featured in an upcoming issue of the Marshall Star. Marshall team members can join a Breast Cancer Awareness group on ExplorNet [here](#).

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Von Braun Symposium to be held Oct. 15-18

The fifth annual Von Braun Symposium will be held Oct. 15-18 at the University of Alabama in Huntsville's Chan Auditorium

in the Administrative Science Building on Ben Graves Drive. This year's theme is "Space Exploration, Security and Commerce: Our Path Forward."

The symposium has been recognized for the excellence of its symposia as well as for its impact on shaping the U.S. space program. Attendees have opportunities to meet with leaders in their field and in related disciplines, exchange information and ideas, discuss career aspirations and expand their horizons.

The event is organized by the American Astronautical Society in conjunction with UAHuntsville, the Marshall Space Flight Center and the Huntsville National Space Club.

Marshall team members can visit ExplorNet [here](#) for more information. For directions to Chan Auditorium, visit [here](#).

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Mobile Native Sabrina Savage Named Deputy Project Scientist for NASA's Hinode Mission to Study the Sun

By Janet Anderson



Sabrina Savage (NASA/MSFC/Emmett Given)

Sabrina Savage, a research astrophysicist at the Marshall Space Flight Center, has been named deputy project scientist for Hinode, the joint U.S.-Japanese mission to study the sun.

Savage, who joined NASA as a full-time employee in summer 2012, specializes in the sun and solar activity. While helping to lead the Hinode team, she also will continue her research into solar coronal flows and will participate in missions to develop new solar monitoring instrumentation.

As a post-doctoral researcher at NASA's Goddard Space Flight Center from 2010-2012, Savage studied flows above active regions on the sun during long-duration flaring events, primarily using high-energy, extreme ultraviolet and X-ray space telescopes. Her primary goal is to understand turbulent solar processes and the rise of the magnetic field through the sun's surface, and to determine how these dramatic solar upheavals can result in explosions like solar flares and coronal mass ejections.

The high-energy particles created during these events play a critical role in the dynamics of space weather. Extreme space weather influences the Earth's atmosphere, threatens the function of satellites in Earth's orbit, and potentially could impact communications systems and power grids on the surface.

A native of Mobile, Savage earned a bachelor's degree in physics in 2002 from the University of South Alabama in Mobile. She received a master's degree in physics and astronomy in 2004 from the University of Wyoming at Laramie, and earned a doctorate in physics from Montana State University in Bozeman in 2010.

Savage and her husband, Dr. Tyson Littenberg, have four children. They reside in Madison.

For more information about Hinode, visit http://www.nasa.gov/mission_pages/hinode/index.html.

Anderson is a public affairs officer in the Office of Strategic Analysis & Communications.

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Association

Patrick Rasco, director of labor relations in the Marshall Space Flight Center's Office of Center Operations, and the 2012 Combined Federal Campaign chairman, recently was named president of the Alabama chapter of the Labor and Employment Relations Association.

The national organization provides professionals -- interested in all aspects of labor and employment relations -- with networking opportunities to share ideas and learn about new developments, issues and practices in their respective fields. As president of the state chapter, Rasco will lead those efforts that affect management, labor, academic and government officials across Alabama. Rasco also is involved with the organization on the national level, serving a third term as a member of the Labor and Employment Relations Association's National Advisory Committee.



Patrick Rasco (NASA/MSFC/Emmett Given)

"Being involved with the Labor and Employment Relations Association, on a state and national level, is good for Marshall because it affords the center access to experts -- like federal officials, state government and union presidents -- who understand the importance of having a solid labor program at the center to achieve mission success," Rasco said.

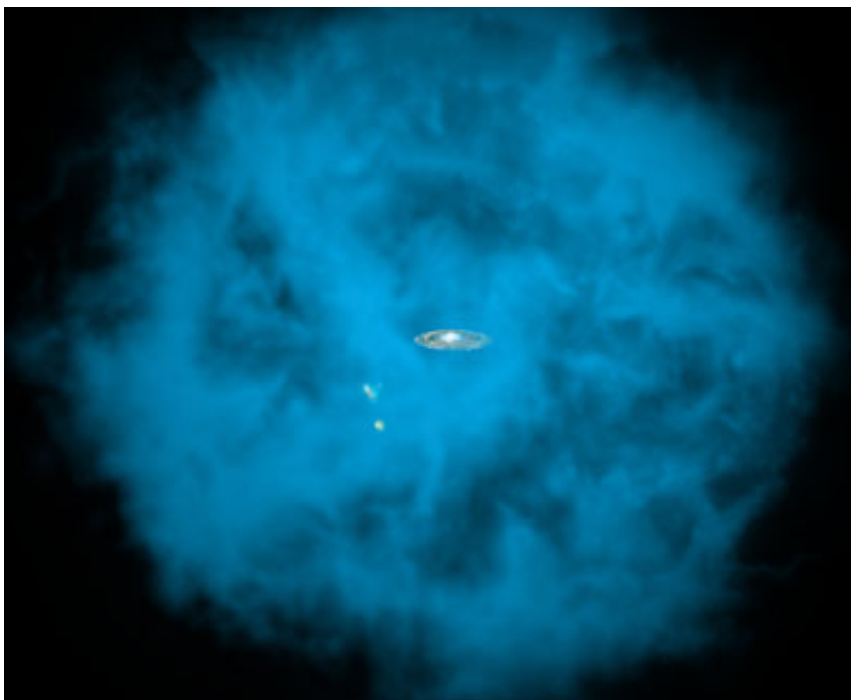
"It also helps us maintain positive, productive relationships between our contractor labor workforce and managers. I'm looking forward to an exciting year as president and will focus on increasing awareness and membership of our organization across the state."

Rasco was inducted in his new role with the Alabama organization at the state Labor and Employment Relations Association's fall conference on Sept. 25 in Orange Beach, Ala.

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NASA's Chandra Shows Milky Way is Surrounded by Halo of Hot Gas

NASA news release



Astronomers have used NASA's Chandra X-ray Observatory to find evidence our Milky Way Galaxy is embedded in an enormous halo of hot gas that extends for hundreds of thousands of light-years. The estimated mass of the halo is comparable to the mass of all the stars in the galaxy.

Image left: This artist's illustration shows an enormous halo of hot gas (in blue) around the Milky Way galaxy. Also shown, to the lower left of the Milky Way, are the Small and Large Magellanic Clouds, two small neighboring galaxies. The halo of gas is shown with a radius of about 300,000 light-years, although it may extend significantly farther. (NASA/CXC/M.Weiss; NASA/CXC/Ohio State/A.Gupta et al.)

If the size and mass of this gas halo is confirmed, it also could be an explanation for what is known as the "missing baryon" problem for the galaxy.

Baryons are particles, such as protons and neutrons, that make up more than 99.9 percent of the mass of atoms found in the cosmos. Measurements of extremely distant gas halos and galaxies indicate the baryonic matter present when the universe was only a few billion years old represented about one-sixth the mass and density of the existing unobservable, or dark, matter. In the current epoch, about 10 billion years later, a census of the baryons present in stars and gas in our galaxy and nearby galaxies shows at least half the baryons are unaccounted for.

In a recent study, a team of five astronomers used data from Chandra, the European Space Agency's XMM-Newton space observatory and Japan's Suzaku satellite to set limits on the temperature, extent and mass of the hot gas halo. Chandra observed eight bright X-ray sources located far beyond the galaxy at distances of hundreds of millions of light-years. The data revealed X-rays from these distant sources are absorbed selectively by oxygen ions in the vicinity of the galaxy. The scientists determined the temperature of the absorbing halo is between 1 million and 2.5 million kelvins, or a few hundred times hotter than the surface of the sun.

Other studies have shown that the Milky Way and other galaxies are embedded in warm gas with temperatures between 100,000 and 1 million kelvins. Studies have indicated the presence of a hotter gas with a temperature greater than 1 million kelvins. This new research provides evidence the hot gas halo enveloping the Milky Way is much more massive than the warm gas halo.

"We know the gas is around the galaxy, and we know how hot it is," said Anjali Gupta, lead author of The Astrophysical Journal paper describing the research. "The big question is, how large is the halo, and how massive is it?"

To begin to answer this question, the authors supplemented Chandra data on the amount of absorption produced by the oxygen ions with XMM-Newton and Suzaku data on the X-rays emitted by the gas halo. They concluded that the mass of the gas is equivalent to the mass in more than 10 billion suns, perhaps as large as 60 billion suns.

"Our work shows that, for reasonable values of parameters and with reasonable assumptions, the Chandra observations imply a huge reservoir of hot gas around the Milky Way," said co-author Smita Mathur of Ohio State University in Columbus. "It may extend for a few hundred thousand light-years around the Milky Way or it may extend farther into the surrounding local group of galaxies. Either way, its mass appears to be very large."

The estimated mass depends on factors such as the amount of oxygen relative to hydrogen, which is the dominant element in the gas. Nevertheless, the estimation represents an important step in solving the case of the missing baryons, a mystery that has puzzled astronomers for more than a decade.

Although there are uncertainties, the work by Gupta and colleagues provides the best evidence yet that the galaxy's missing baryons have been hiding in a halo of million-kelvin gas that envelopes the galaxy. The estimated density of this halo is so low that similar halos around other galaxies would have escaped detection.

The paper describing these results was published in the Sept. 1 issue of The Astrophysical Journal Letters. Other co-authors were Yair Krongold of Universidad Nacional Autonoma de Mexico in Mexico City; Fabrizio Nicastro of Harvard-Smithsonian Center for Astrophysics in Cambridge, Mass.; and Massimiliano Galeazzi of University of Miami in Coral Gables, Fla.

The Marshall Space Flight Center manages the Chandra program for NASA's Science Mission Directorate in Washington. The Smithsonian Astrophysical Observatory controls Chandra's science and flight operations from Cambridge.

For Chandra images, multimedia and related materials, visit <http://www.nasa.gov/chandra>.

Tom Kibble, Professor Emeritus at Imperial College London, to Speak on Unification of Weak and Electromagnetic Interactions Oct. 23

On Oct. 23, Tom Kibble, professor emeritus at Imperial College London, will present a historical account of the developments leading up to the unification of weak and electromagnetic interactions, as seen from his viewpoint.

The presentation, titled Genesis of the Higgs Boson and Electroweak Symmetry Breaking, is part of the Distinguished Lecturer Series that is co-sponsored by NASA, the University of Alabama in Huntsville, and the National Space Science and Technology Center.

The event will be held at UAHuntsville's Chan Auditorium in the Administrative Science Building on Ben Graves Drive at 2:30 p.m. All Marshall Space Flight Center team members are invited to attend.

For more information, team members can visit [here](#).



Tom Kibble (Imperial College London website)

Marshall Association Awards Four Scholarships to Children of Marshall Employees



The Marshall Association has recently awarded scholarships to four college-bound children of Marshall Space Flight Center team members.

Image left: Katherine Chavis, left, Marshall Association president, and Beverly Reynolds, far right, scholarship committee chair, award 2012 Marshall Association scholarship recipients to, from second left, Bayleigh Y. Hicks, Paul E. Thompson, Marasia S. Tickles and Stephen G. Cruit. (NASA/MSFC/Emmett Given)

Stephen G. Cruit, Bayleigh Y. Hicks, Marasia S. Tickles and Paul E. Thompson received Marshall Association scholarships for the 2012-

13 school year, totaling \$3,000.

The Marshall Association, which includes civil service employees, contractors and retirees, provides informal networking and community-building opportunities for members. In addition to the annual college scholarship competition, the association sponsors a speaker program addressing topics of interest to Marshall Center workers.

Membership dues and donations are used by the association to provide the annual monetary awards in technical and nontechnical fields of study. To be considered, students must submit scholarship applications and their parents must be

association members.

Applicants are judged on classroom performance, SAT and or ACT scores, extracurricular activities, community involvement and an essay on what they want to be doing 10 years from now. Winners are chosen by a team of Marshall Association members.

About the award recipients

Stephen "Glenn" Cruit is the son of Wendy Cruit, Space Launch System stages element lead systems engineer in the Engineering Directorate, and grandson of Steve Richards, a NASA retiree currently supporting SLS in the Engineering Directorate as a senior consultant with Jacobs/Bangham Engineering. He is a freshman majoring in electrical/computer engineering at the University of Alabama in Huntsville.

Bayleigh Y. Hicks is the daughter of Roslin Hicks, supervisor of the Planning & Facilities Utilization Office of the Office of Center Operations. She is a freshman majoring in secondary education at the University of Alabama in Tuscaloosa.

Marasia S. Tickles is the daughter of Dr. Virginia Tickles, aerospace technologist in the Engineering Cost Office of the Office of Strategic Analysis & Communications. She is a freshman majoring in electrical engineering at Tuskegee University in Tuskegee, Ala.

Paul E. Thompson is the son of aerospace engineer Paul Thompson of the Engineering Directorate, and Rhonda Thompson, facilitator for the National Institute for Rocket Propulsion Systems' Solutions Facilitator Team in the Flight Programs & Partnerships Office. He is a freshman majoring in business at Morehouse College in Atlanta, Ga.

The next Marshall Association scholarship opportunity will be announced in the summer of 2013. For more information about the association, team members can visit [here](#). For a membership application, visit [here](#).

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Obituaries

Gilbert A. Wilhold, 77, of Guntersville died Sept. 22. He retired from the Marshall Center in 1995 as a flight vehicle acoustics aerospace engineer.

Donald E. Morris, 85, of Huntsville died Sept. 28. He retired from the Marshall Center in 1995 as a chemical engineer. He is survived by his wife, Dean Morris.

Find this article at:

<http://www.nasa.gov/centers/marshall/about/star/index.html>